

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:
Jill V. Watson, et al

Serial No. 10/803,710

Group Art Unit: 1795

Filed: March 18, 2004

Examiner: Julian A. Mercado

For: SEPARATOR FOR A BATTERY HAVING A ZINC ELECTRODE

REPLY BRIEF 37 CFR 41.41

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This Reply Brief is being filed within two months from the mailing date of the Examiner's Answer, which was mailed on June 26, 2008.

CERTIFICATE OF EFS TRANSMISSION

I hereby certify that this correspondence is being filed electronically with the United States Patent and Trademark Office on August 22, 2008.



Janice B. Davis

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I. Status of the claims

Claims 12 and 28 have been rejected under 35 U.S.C. § 112 second paragraph.

Claims 1-32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,298,666 in view of U.S. Patent No. 3,811,957.

Claims 1-32 are the subject of this appeal.

Claims 1 and 17 are the subject of this appeal and should be considered separately.

Claims 2-16 depend from claim 1; thus, the allowance of claims 2-16 depend from the allowance of claim 1. As a result, claims 1-16 stand or fall together.

Claims 18-32 depend from claim 17; thus, the allowance of claims 18-32 depend from the allowance of claim 17. As a result, claims 17-32 stand or fall together.

II. Grounds of rejection to be reviewed on appeal

Since Applicant requests separate consideration of dependent claims 12 and 28, and claims 1-16 and 17-32, the rejection/objection shall be grouped by claim.

1. Claims 12 and 28 are rejected under 35 U.S.C. 112, second paragraph because of the use of "freshly" one time in each of claim 12 and 28. Those places are (rejected term italicized):

- a. Claim 12, Lines 1-3 - "The separator according to Claim 11, wherein said separator being *freshly* coated, and said separator being wetted within 8 seconds or less."
- b. Claim 28, Lines 1-3 - "The battery according to Claim 27, wherein said separator being *freshly* coated, and said separator being wetted within 8 seconds or less."

In each instance, the Examiner states that "freshly" is a relative term which renders the claim indefinite because the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

2. Claims 1-16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,298,666 in view of U.S. Patent No. 3,811,957.

3. Claims 17-32 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,298,666 in view of U.S. Patent No. 3,811,957.

III. Argument

Applicants note that in the Examiner's Answer the Examiner has acknowledged that: the (3) STATUS OF THE CLAIMS, (4) STATUS OF AMENDMENTS, (5) SUMMARY OF THE CLAIMED SUBJECT MATTER, (6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL, (7) CLAIMS APPENDIX, are all correct. Further it is noted that Applicants provided a statement identifying the (1) REAL PARTY IN INTEREST, and the (2) RELATED APPEALS AND INTERFERENCES.

Applicants note that there is no controversy on what the stated grounds of rejection are, the only issue in controversy is whether the Examiner's rejection of Claims 12 and 28 under 35 U.S.C. 112, second paragraph is correct, and the Examiner's rejection of claims 1-16 and 17-32 as being unpatentable over U.S. Patent No. 4,298,666 in view of U.S. Patent No. 3,811,957.

The multiple inaccurate or misleading statements in the Examiner's Answer compel the Applicant to file this reply brief.

THE INVENTION

The invention, as discussed in the Applicant's Appeal Brief, is a battery separator which includes a microporous membrane, and a coating on at least one surface of the microporous membrane. The coating includes a mixture of 25-40 weight % polymer and 60-75 weight % surfactant combination. The polymer is cellulose acetate, and the surfactant combination

includes a first surfactant which has an active ingredient selected from the group consisting of organic ethers and a second surfactant which is an oxirane polymer with 2-ethylhexyl dihydrogen phosphate.

The invention also includes a battery with a first electrode, a second electrode (one of the electrodes is a zinc electrode), an electrolyte, and a battery separator, as described above, disposed between the two electrodes.

Batteries having zinc electrodes are known, however in the past, they have not enjoyed commercial success due to substantial problems with dendrite growth, as demonstrated in the Background of the instant application and in the Examiner's rejection via Taskier. Please see Specification, page 1, line 8 - page 2, line 8 (citing U.S. Pat. Nos. 4,359,510; 4,438,185; and 4,544,616; and *Handbook of Battery Materials*, Wiley-VCH, New York, N.Y. (1999)). It has been suggested that microporous films could be used to overcome the problems associated with the use of zinc electrodes. See: U.S. Pat. Nos. 4,359,510; 4,438,185; and 6,479,190. While the use of a microporous film as a battery separator has been a positive factor in combating dendrite growth, it has also lead to the development of new problems, namely the inability to store a membrane for extended periods of time, and the inability to rapidly wet a membrane after storage.

The instant application solves these problems by using a combination of a first and second surfactant which has a dual purpose of wetting the membrane in aqueous electrolyte in a short period of time and maintaining the long term storage life of the membrane. However, not just any two surfactants may be combined to obtain the results of the instant invention. Each of the two surfactants must satisfy several key considerations in order to be utilized. The acceptability of the first surfactant is determined by three considerations which are: 1) first surfactant must be inert to the electrolyte (e.g. non-hydrolysable in the electrolyte); 2) first surfactant should not be soluble or readily soluble in the electrolyte; and 3) first surfactant should be adherent to the membrane. The acceptability of the second surfactant is determined by two considerations which are: 1) second surfactant must be inert to the electrolyte (e.g. non-hydrolysable in the electrolyte); 2) second surfactant must increase the wetting speed and stability of the membrane without interfering with long term membrane storage life.

Neither Taskier nor Buntin contain any information about using a combination of a first surfactant selected from the group consisting of organic ethers and a second surfactant being an oxirane polymer with 2-ethylhexyl dihydrogen phosphate, each of which satisfy the above considerations. Additionally, there

is no disclosure within Taskier or Buntin that would allow for one skilled in the art to predict that a combination of a first and second surfactant would in any manner result in the superior surfactant combination of Applicant's instant application.

A. CLAIMS 12 AND 28 ARE NOT INDEFINITE UNDER 35 U.S.C. 112

In the Examiner's answer on page 7, lines 16-19 states that equating the term "freshly" to the terms "recently", "just now", or "newly and in a fresh manner" fails to negate the §112, second paragraph rejection because these terms are "nothing more than equally indefinite terms which fail to further limit or give concise meaning to the term "freshly" as used in the claims. The Examiner further states that the "claims are wholly absent of any temporal boundary" within which the separator is 'freshly coated'" and this lack of temporal boundary renders the term indefinite. See page 8, lines 1-6. The Examiner is clearly mistaken.

As stated in the Applicant's Appeal Brief, "freshly," as used in claims 12 and 28 of the instant application, is an adverb which modifies the verb "coated." In claims 12 and 28, the adverbial function of "freshly" is to describe when the battery separator was coated with a polymer and a first and second surfactant prior to being wetted. Looking to Tables 2 and 3, it is clearly demonstrated that the comparative results

detail a time-line of 0, 22, 48, 104, 122, and 256 days. (Specification, pages 15-16) Based on the wetting time limitation of 8 seconds or less, the term "freshly" clearly falls within day 0 of Tables 2 and 3 and thus provides the temporal boundary sought by the Examiner. Beginning after day 0, the separator is stored for the designated number of days and is then no longer "freshly coated". Therefore the specification does provide a standard for ascertaining the requisite degree, thus apprising one of ordinary skill in the art of the scope of the invention.

Hence, claims 12 and 28, for the reasons explained above, are not indefinite under 35 U.S.C. 112 due to the use of the word "freshly"; thus, the above mentioned 112 rejections are improper, and they must be removed.

B. CLAIMS 1-16 ARE PATENTABLE UNDER 35 U.S.C. 103(a)

In the Examiner's answer on page 8, line 21 - page 9, line 19, the Examiner submits that the data and unexpected results illustrated in Table 1, Samples 1-6 is insufficient to rebut the *prima facie* case of obviousness because, first, the rejection is based on a combination of Taskier in view of Buntin, and not the references individually, and second, because "there is no language in any of the claims drawn to wet times as a function of length of storage." The Examiner is clearly mistaken.

As stated in Appellant's Appeal Brief, only by ignoring the data and unexpected results illustrated by Samples 1-6 in Tables 1, 2, and 3 contained within the specification of the instant application, the Examiner claims to have established a prima facie case of obviousness. An applicant can rebut a prima facie case of obviousness by presenting comparative test data showing that the claimed invention possesses unexpectedly improved properties or properties that the prior art does not have. See Appeal Brief page 12, line 24 - page 13, line 15. In the Examiner's answer on page 9, lines 1-3 the Examiner concedes that Sample 1 is a fair representation of Buntin's use of an organic ether as its sole surfactant and that Sample 2 (I believe the Examiner means Sample 6) is representative of Taskier's use of an oxirane polymer with 2-ethylhexyl dihydrogen phosphate as its sole surfactant. Table 3 clearly shows that Sample 6 (as used by Taskier) failed to wet after 22 days of storage and that the wet time for Sample 1 (as used by Buntin) grew progressively worse as storage time increased. See Appeal Brief, page 14, lines 6-14.

Appellant will now clarify that based on the data shown for Samples 1 and 6, there is clearly no indication that by combining an organic ether (Buntin) and an oxirane polymer with 2-ethylhexyl dihydrogen phosphate (Taskier) for use as a surfactant as described in the instant application, that the unexpected results illustrated by Samples 2-5 would be achieved.

Additionally, there is clearly no indication or motivation within either Taskier or Buntin that combining either of their single surfactants with an additional surfactant would yield the unexpected results illustrated for Samples 2-5. Contrary to the Examiner's argument, the Appellant had no intention of attacking each cited piece of prior art individually, as illustrated in Appellant's Appeal Brief on page 14, lines 14-17 (citing the data from Samples 2-5).

In response to the Examiner's second assertion that, "there is no language in any of the claims drawn to wet times as a function of length of storage," Appellant points out that M.P.E.P. 608.01(i) requires that claims must particularly point out and distinctly claim the subject matter which the applicant regards as their invention. Additionally, M.P.E.P. 608.01(g) requires that the detailed description in the specification, "must be in such particularity as to enable any person skilled in the pertinent art or science to make and use the invention without involving extensive experimentation." Looking to the case of *MGP Ingredients, Inc. v. Mars, Inc.* 494 F. Supp.2d 1231, (2007), (citing *Phillips v. AWH Corp.* 415, F.3d 1303 (Fed. Cir. 2005)) we find that "[t]he claims do not stand alone, but are part of 'a fully integrated written instrument.' *Id.* at 1315. Therefore, they 'must be read in view of the specification of which they are a part.' *Id.*" *Id.* at 1234. Based on the above

cited language it is clear that the function of the specification is to further define the claims as they are presented in an application. In the instant application, the specification does exactly that, it further defines claims 1 and 17 as to the three considerations which must be met for the first surfactant to be acceptable and the two considerations which must be met for the second surfactant to be acceptable. Hence, the Examiner may not ignore language that is contained within the specification just because it is not contained within the claims, as the Examiner is doing in the instant Appeal.

The Examiner then states on page 10, lines 14-20 in his answer that the motivation to combine the teachings of Taskier and Buntin is to effectively wet the battery. The Examiner notes that Taskier teaches the use of precursor films which include polypropylene (Taskier, col. 8, line 67 - col. 9, line 2). The Examiner then reasons that because Buntin teaches that polypropylene is not easily wettable by aqueous materials (Buntin, col. 11, lines 59-61) and Buntin also teaches the use of organic ethers as a single surfactant, then the combination of both the single surfactant described in Taskier and the single surfactant described in Buntin would be obvious. The Examiner flatly claims that Buntin, "provides the requisite motivation for the proposed modification of Taskier," (page 10,

line 22 - page 11, line 1) but fails to provide any explanation beyond what is stated above.

The U.S. Supreme Court recently held that rigid and mandatory application of the "teaching-suggestion-motivation," or TSM, test is incompatible with its precedents. *KSR Int'l Co. v. Teleflex, Inc.* 127 S.Ct 1727, 1741 (2007). The Court did not, however, discard the TSM test completely; it noted that its precedents show that an invention "composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *Id.*

The Court held that the TSM test must be applied flexibly, and take into account a number of factors "in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed." *Id.* at 1740-41. Despite this flexibility, however, the Court stated that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements in the way the claimed new invention does." *Id.* "To facilitate review, this analysis should be made explicit." *Id.*

The obviousness rationale addressed in *KSR* was premised on combining elements known in the prior art. *Id.* at 1738-39. A parallel analysis applies, however, to a rejection premised on the obviousness of modifying a known composition to change its properties, as is the case in this Appeal.

The *KSR* Court noted that obviousness cannot be proven merely by showing that the elements of a claimed device were known in the prior art; it must be shown that those of ordinary skill in the art would have had some "apparent reason to combine the known elements in the fashion claimed." *Id.* at 1741. The Examiner has clearly failed to do that in this instance. The Examiner simply states, "that the skilled artisan would find obvious to modify Taskier's separator comprised of polypropylene with the specific surfactant of Buntin in order to enhance its wettability property..." See page 11, lines 2-4. Just as the Supreme Court in *KSR* warned against, the Examiner in the instant Appeal is merely reciting the elements as they are independently known in the prior art and then making a substantial leap to combine two surfactants that were previously used independently with no teaching or suggestion to use a combination of surfactants instead of just a single surfactant.

In the Examiner's answer on page 11, lines 7-13, the Examiner again discounts the use of the three considerations to be taken into account for the first surfactant and the two considerations to be taken into account for the second surfactant. Appellant restates the arguments detailed above concerning this material.

Claims 1-16, for the reasons detailed above, are not unpatentable under 35 U.S.C. 103(a) based on U.S. Patent No.

4,298,666 (hereinafter Taskier) in view of U.S. Patent No. 3,811,957 (hereinafter Buntin); thus, the above mentioned 103 rejections are improper, and they must be removed.

C. CLAIMS 17-32 ARE PATENTABLE UNDER 35 U.S.C. 103(a)

In the Examiner's answer on page 14, line 15 - page 5, line 3, the Examiner submits that the data and unexpected results illustrated in Table 1, Samples 1-6 is insufficient to rebut the *prima facie* case of obviousness because, first, the rejection is based on a combination of Taskier in view of Buntin, and not the references individually, and second, because "there is no language in any of the claims drawn to wet times as a function of length of storage." The Examiner is clearly mistaken.

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its sole surfactant and that Sample 2 (Again, I believe the Examiner means Sample 6) is representative of Taskier's use of an oxirane polymer with 2-ethylhexyl dihydrogen phosphate as its sole surfactant. Table 3 clearly shows that Sample 6 (as used by Taskier) failed to wet after 22 days of storage and that the wet time for Sample 1 (as used by Buntin) grew progressively worse as storage time increased. See Appeal Brief, page 24, lines 4-12.

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The Examiner then states on page 16, lines 8-14 in his answer that the motivation to combine the teachings of Taskier and Buntin is to effectively wet the battery. The Examiner notes that Taskier teaches the use of precursor films which include polypropylene (Taskier, col. 8, line 67 - col. 9, line 2). The Examiner then reasons that because Buntin teaches that polypropylene is not easily wettable by aqueous materials (Buntin, col. 11, lines 59-61) and Buntin also teaches the use of organic ethers as a single surfactant, then the combination of both the single surfactant described in Taskier and the single surfactant described in Buntin would be obvious. The Examiner flatly claims that Buntin, "provides the requisite motivation for the proposed modification of Taskier," (page 16, lines 16-17) but fails to provide any explanation beyond what is stated above.

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Supreme Court in KSR warned against, the Examiner in the instant Appeal is merely reciting the elements as they are independently known in the prior art and then making a substantial leap to combine two surfactants that were previously used independently with no teaching or suggestion to use a combination surfactants instead of just a single surfactant.

In the Examiner's answer on page 17, lines 1-7, the Examiner again discounts the use of the three considerations to be taken into account for the first surfactant and the two considerations to be taken into account for the second surfactant. Appellant restates the arguments detailed above concerning this material.

Claims 17-32, for the reasons detailed above, are not unpatentable under 35 U.S.C. 103(a) based on U.S. Patent No. 4,298,666 (hereinafter Taskier) in view of U.S. Patent No. 3,811,957 (hereinafter Buntin); thus, the above mentioned 103 rejections are improper, and they must be removed.

CONCLUSION

In view of the foregoing, Applicant respectfully requests that the Board overturns the Examiner's rejections based on indefiniteness, unpatentability, and obviousness and allows claims 1-32.

Respectfully submitted,



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